

Description

Removable Quick Connection

BACKGROUND OF INVENTION

[0001] The present invention relates to an improved removable quick connection used primarily for parts transferring pressurized fluid or gas.

[0002] Typically such connections have a male member with either a groove or cylindrical protrusion used to secure the connection, a female member with a groove for capturing the retaining element, a sealing element recessed in a groove in either the male or female member, and a retaining element.

[0003] Currently the retaining rings used are non-removable in nature and as such may never be replaced if they wear or break. Also, current designs either: do not allow later removal of the male member, have a separate locking or unlocking clip, use a separately energized retaining ring, or use a segmented retaining ring. One such example is the removable plug-in socket connection as shown in U.S. Pat. No. 4,613,172 to Schattmaier, that uses a separate

locking clip, and a separately energized retaining ring that is segmented.

FIELD OF THE INVENTION

[0004] The present invention relates to a removable quick connection, and method of producing said connection. More specifically, the present invention relates to a novel retaining ring and groove assembly designed for use in a pressurized fluid or gas connection, where the male member is secured into the female member.

SUMMARY OF INVENTION

[0005] According to the present invention the male member of the connection is designed with the standard outside diameter to mate with the female half, according to the requirements of the sealing element. A groove is added to either the male or female member to secure a sealing element that will seal against pressurized fluid or gas. Another groove is added to the male member for the retention of the retaining ring with a groove diameter of slightly less than the internal diameter, not counting the lugs, of the fully compressed retaining ring, to allow for the compression of the retaining ring once the parts have been assembled. The male member is also designed with

a cutout starting at the retaining ring groove and proceeding to the back end of the male member. This cutout is deep enough to line up with, and tangent to, the listed internal diameter, including lugs, of the retaining ring, when in the listed shaft diameter. This cutout allows access to the lugs for later disassembly and prevents rotation of the retaining ring. The female member is configured with the listed groove dimensions from the retaining ring manufacturer.

BRIEF DESCRIPTION OF DRAWINGS

- [0006] Figure 1 is a cutaway view of a prior art removable plug-in socket connection
- [0007] Figure 2 is a cutaway view of the assembly
- [0008] Figure 3 is a principal view of the assembly showing the access to the retaining ring
- [0009] Figure 4 is a cutaway view of the male member showing the cutout, retaining ring groove, and seal groove
- [0010] Figure 5 is a cutaway view of the female member showing the retaining ring groove and lead in taper
- [0011] Figure 6 is a principal view of the standard retaining ring
- [0012] Figure 7 is a principal view of the sealing element

DETAILED DESCRIPTION

[0013] A commonly known removable plug-in socket connection is shown in Figure 1. The connection consists of a male member 5, a female member 6, a sealing element 7, a retaining ring 8, an energizer 9, and an unlocking clip 10. The female member 6 is provided with a groove 6a to capture the retaining ring 8 and energizer 9. The female member 6 also contains a second groove 6b that captures the sealing element 7, and a third groove 6c that captures the separate unlocking clip 10.

[0014] The present invention relates to an improved removable quick connection for use in the transfer of pressurized fluid or gas. In general, the connection system comprises of a simplified retaining ring 1 (Figure 6), a sealing element 4 (Figure 7), a female member 2 (Figure 5), and an improved male member 3 (Figure 4) with an improved groove 3a and cutout 3c arrangement.

[0015] More specifically, the connection is shown as a cutaway view in Figure 2. The female member 2 in a preferred embodiment has a taper 2b leading in to the retaining ring groove 2a to allow for easier connection. The male member 3 is configured with a groove to contain the sealing element 3b, used to seal against pressurized fluid or gas. The male member 3 also has a groove 3a to capture the

retaining ring 1 on the male member 3 in preparation for connection assembly. The groove for the retaining ring 3a is designed not to allow the lugs of the retaining ring 1 to be accessible after insertion, however the cutout 3c allows for the lugs to be accessible and limits the orientation of the retaining ring 1 after it has been placed on the male member 3. The retaining ring groove 3a is designed to be deep enough such that, when the male member 3, with installed retaining ring 1, is pushed into the female member 2 the retaining ring 1 is able to compress to pass through the taper 2b on the female member 2, and the retaining ring 1 springs back to the diameter of the retaining ring groove 2a of the female member 2 when the retaining ring 1 enters the groove 2a. Once assembled the retaining ring 1 holds the male member 3 and the female member 2 together by means of the retaining ring groove of the female member 2a and the retaining ring groove of the male member 3a.

[0016] Figure 3 shows, in a principal view of the assembled connection, the cutout 3c on the male member 3 that allows access to the retaining ring 1 after assembly of the connection. Having access to the retaining ring 1 allows for the retaining ring 1 to be compressed, through the use of

retaining ring pliers or a similar tool, such that the male member 3, with the sealing element 4 and retaining ring 1 still captured, may be removed from the female member 2 in a reverse manner as to the method that was used to assemble the connection. Once the male member 3 has been removed from the female member 2, the sealing element 4 and the retaining ring 1 are left exposed and as such may easily be accessed for means of examination or replacement.

[0017] A clearer cutaway view of the male member 3 is shown in Figure 4. The member is in a preferred embodiment configured with a trailing diameter $3d$ that is equal in radius to the distance of the cutout $3c$ from the center axis of the male member 3, to allow for easy access to the retaining ring 1 via the cutout $3c$.

[0018] A simple cutaway view of the female member 2 in Figure 5 shows the taper $2b$ leading to the retaining ring groove $2a$ of the female member 2. In a preferred embodiment the taper $2b$ has an internal diameter greater than that of the free diameter of the retaining ring 1, at the open end of the taper, to allow for easy alignment of the male member 3 and retaining ring 1 during assembly of the connection.

[0019] A more detailed view of the retaining ring 1, and sealing

element 4 can be seen in Figure 6 and Figure 7 respectively.

[0020] The invention is described in an illustrative manner, and it is to be understood that the terminology, which has been used is intended to be in the nature of description rather than of limitation.